

WHAT IS CLAIMED IS:

1. A conductive resin film comprising a conductive substrate layer and a low-resistance layer with a volume resistance of 0.1 to 1.0 Ωcm in a thickness direction as at least one of its outermost layer.

2. The conductive resin film as claimed in Claim 1, wherein a volume resistance of the low-resistance layer in a thickness direction is 1/5 or less of a volume resistance of the substrate layer in a thickness direction.

3. The conductive resin film as claimed in Claim 1 or 2, wherein the low-resistance layer is a layer in which the thermoplastic resin comprises a fine carbon fiber with a fiber diameter of 0.003 to 0.5 μm and a fiber length of 0.1 to 100 μm as a conductive agent.

4. The conductive resin film as claimed in any of Claims 1 to 3, wherein a thickness of the low-resistance layer is 1 to 50 μm .

5. The conductive resin film as claimed in any of Claims 1 to 4, wherein the substrate layer comprises a conductive agent selected from the group consisting of graphite powder, exfoliated graphite, carbon black, carbon fiber, carbon nanofiber, carbon nanotube, a metal carbide, a metal nitride, a metal oxide, metal fiber and metal powder.

6. A process for manufacturing a conductive resin film having a low-resistance layer as at least one of its outermost layers, comprising the steps

of applying a liquid composition of a fine carbon fiber and a thermoplastic resin in a solvent to a flat surface of a support, followed by drying or curing to form a coating film; placing the coating film over at least one side of a conductive substrate layer; and performing a lamination.

7. A conductive resin film as claimed in any of Claims 1 to 5 used as a collector for an electric double layer capacitor.

8. A collector for an electric double layer capacitor comprising the conductive resin film as claimed in Claim 7.

9. A conductive resin film comprising a thermoplastic resin containing a fine carbon fiber having a fiber diameter of 0.001 to 0.5 μm and a fiber length of 0.1 to 100 μm , wherein when a mixing volume ratio of the thermoplastic resin to the fine carbon fiber is expressed by the equation:

$$\text{Thermoplastic resin/Fine carbon fiber} = x/(100-x)$$

and a volume resistance of the film is y in Ωcm , a coordinate point (x,y) in a x - y plane is within a range enclosed by a quadrangle with four apices (50,0.01), (50,0.03), (90,0.1) and (90,0.5) including the lines and the apices.

10. The conductive resin film as claimed in Claim 9, wherein a thickness of the conductive resin film is 10 to 200 μm .

11. A process for manufacturing a conductive resin film, comprising the steps of applying a liquid composition of a fine carbon fiber having a fiber diameter of 0.001 to 0.5 μm and a fiber length of 0.1 to 100 μm and a

thermoplastic resin in a solvent to a flat surface of a support, followed by drying or curing to form a coating film; and then peeling the coating film from the support.

12. A conductive resin film manufactured by the process as claimed in Claim 11.

13. The conductive resin film as claimed in any of Claims 9, 10 and 12 used as a collector for an electric double layer capacitor.

14. A collector for an electric double layer capacitor comprising the conductive resin film as claimed in Claim 13.

15. A collector for an electric double layer capacitor consisting of a conductive resin film comprising a thermoplastic resin containing a conductive agent, wherein the film has a volume resistance in a thickness direction of 0.01 to 5 Ωcm and a tensile breaking strength of 10 to 30 MPa as measured in accordance with JIS K7127.

16. The collector for an electric double layer capacitor as claimed in Claim 15, wherein the thermoplastic resin is selected from the group consisting of fluororesins, fluoro-rubbers, polyolefins and polyolefin elastomers.

17. The collector for an electric double layer capacitor as claimed in Claim 15 or 16, wherein the conductive agent is selected from the group consisting of carbon nanotube, carbon nanofiber, a metal carbide and a metal

nitride.

18. The collector for an electric double layer capacitor as claimed in any of Claims 15 to 17, wherein a volume ratio of the thermoplastic resin to the conductive agent is 50/50 to 90/10.

19. The collector for an electric double layer capacitor as claimed in any of Claims 15 to 18, wherein a thickness of the conductive resin film is 0.01 mm to 0.5 mm.

20. The collector for an electric double layer capacitor as claimed in any of Claims 15 to 19, wherein at least one side of the conductive resin film comprises a low-resistance layer.

21. A process for manufacturing a collector for an electric double layer capacitor, comprising the steps of forming a conductive layer on a peelable support, placing the conductive layer with the support over at least one side of the conductive substrate layer to transfer the conductive layer, and peeling the support to form a low-resistance layer on the surface of the conductive resin film.

22. A collector for an electric double layer capacitor manufactured by the process as claimed in Claim 21.

23. The collector for an electric double layer capacitor as claimed in any of Claims 15 to 20 and 22, wherein the electric double layer capacitor

comprises an aqueous electrolytic solution.